DETAILED ACTION

Claim Objections

1.   Claims 28-33 are objected to because of the following informalities: there is

insufficient antecedent basis for the limitation "the depth cueing effect." Appropriate

correction is required.

Claim Rejections - 35 USC § 101

2.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
> matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
> conditions and requirements of this title.

Claims 11, 12, 20, 30 and 31 are rejected under 35 U.S.C. 101 because the claimed

invention is directed to non-statutory subject matter. The specification discloses "A

computer-usable information storage medium according to the present invention

comprises a program for implementing the aforementioned means. According to the

present invention, there is provided a computer-usable program (including a program

embodied in a carrier wave) comprising a processing routine for implementing the

aforementioned means" (p. 3). Thus, a computer readable information storage medium

is considered to read on including a carrier wave. Claims reciting a signal encoded with

functional descriptive material are not considered to fall within any of the categories of

patentable subject matter set forth in § 101.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1, 2, 10-12, 20-22 and 27 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Foley et al. (Computer Graphics: Principles and Practice) in view of

Deering (Pub. No. US 2003/0011618 A1) and further in view of Griffin (U.S. Patent No.

5, 990, 904).

5.   In regard to claim 1 Foley et al. teaches a high-level conceptual framework which

can be used to describe almost any interactive graphics system (p. 17, §1.6.1; Fig. 1.5).

Foley et al. teaches that a raster display system, with a peripheral display processor, is

a common architecture that avoids the disadvantages of the simpler raster display by

introducing a separate graphic processor to perform graphics functions. Said system

includes a CPU, system memory, a display processor and display processor memory,

all of which are interconnected via a system bus (p. 170, § 4.3.2; Fig. 4.22). It is noted

said system memory is considered to store a program and data for image generation

and said display processor is considered to perform the processing for image

generating.

Foley et al. teaches that depth cueing, seen as a simplified version of the effects

of atmospheric attenuation, exploits the fact that distant objects (objects intended to

appear father from a viewer) appear dimmer than closer object. In depth cueing

interpolation occurs between the color of a given primitive (color of a given object as

represented by its primitive) and a user-specified depth-cue (target) color (pp. 610-611,

§14.3.4; pp. 727-728, §16.1.3; pp. 1044-1046, §20.8.2). Foley et al. illustrates a depth

cueing area in Color Plate II.24 and Color Plate II.25. It is implicitly taught by Foley et

al. that said depth cueing area depends, at least to some degree, on a viewpoint as said scenes in Color Plate II.24 and Color Plate II.25 contain various graphical information displayed from a given viewpoint. In addition it is noted that said Color Plates are considered to comprise objects in both the background and foreground.

Foley et al. teaches that at times one might want the view volume (e.g., volume which defines a respective depth cueing volume) to be finite, in order to limit the number of output primitives projected on the view plane. This can be accomplished through the use of a front clipping plane and a back clipping plane. Said planes are specified by the by the signed quantities front distance (F) and back distance (B) relative to the view reference point (viewpoint) and along the view-plane normal (p. 240, ¶ 2-3; Fig. 6.19). It is noted that said planes define which, at least in part, define said view volume are considered to be based on, at least in part, said view reference point.

Foley et al. fails to explicitly teach varying an alpha value of the object so that the object being more distant from the viewpoint becomes more transparent. Deering teaches that simple fogging is a special case of alpha blending, in which the degree of alpha changes with distance (depth) so that the object appears to vanish into a haze (alpha varies), as the object moves away from the viewer. This simple fogging may also be referred to as depth cueing or atmospheric attenuation (p. 1, ¶ 11). It would have been obvious to one skilled in the art, at the time of the applicant's invention, to combine the teachings of Foley et al. and Deering in regard to the details of depth cueing and atmospheric attenuation (e.g., haze), because Deering teaches how atmospheric attenuation can be achieved in regard to varying an alpha value and thus serves to

further clarify the application of atmosphere attenuation to a given area when utilized in a given graphic systems.

Foley et al. and Deering fail to explicitly teach sorting objects of which alpha values are varied so that the objects are drawn in succession starting from an object nearest to the viewpoint and performing hidden-surface erasing based on a Z-buffer process for the objects of which alpha values are varied. Griffin teaches an improved method and a hardware system for merging pixel fragments, allowing for a reduction of memory usage in a given graphics rendering system (col. 4, lines 66-67; Abstract). Griffin teaches that said system utilizes Z-buffering, which has the advantages of computational speed and simplicity (col. 9, lines 55-57; col. 3, lines 48-49). Griffin further teaches that color and alpha are accumulated using a front to back approach and that for hardware implementations front to back is preferable because the resolve process is less hardware intensive (col. 42, lines 10-67; col. 43, lines 1-46). Griffin further teaches that said system supports a wide range of interactive applications. Its ability to support advanced real time animation makes it well-suited for games, educational applications, and a host of interactive applications (col. 7, lines 1-5).

Foley et al. and Deering fail to explicitly teach that said depth cueing value and said alpha value, which vary by depth, are varied for each vertex of the object. Griffin teaches that the method begins by queuing primitives in the set-up block 383. The vertex input processor 384 parses the input data stream and queues triangle data in the vertex control registers 387 (961, 962). The scan convert block 397 performs pixel generation operations as soon as requested texture data is available in the texture

cache 402. The pixel engine 406 performs pixel level calculations including hidden

surface removal and blending operations. To perform hidden surface removal, the pixel

engine 406 compares depth values for incoming pixels (fully covered pixels or pixel

fragments) with pixels at corresponding locations in the pixel or fragment buffers. After

performing the pixel level calculations, the pixel engine stores the appropriate data in

the pixel or fragment buffers (col. 32, lines 55-67; col. 33, lines 1-37). As illustrated in

Fig. 9A-9B said pixel information is generated from said vertex information and thus

said pixel information is considered to represent said vertex information.

Griffin further teaches that the merge test blocks 1000-1008 compare the depth,

color and alpha components for new and previous pixel fragments, and if the new and

previous values are within a predetermined tolerance, they output a bit indicating that

the new pixel fragment is a merge candidate. The pixel engine then performs a bitwise

AND (1010) to determine whether each of the merge tests has passed. If so, the pixel

engine merges the new and previous pixel fragments. The pixel engine can attempt to

merge an incoming pixel fragment only with the pixel fragment closest to the viewpoint

(with lowest z value) or can attempt to merge with several pixel fragments stored for a

pixel location (col. 37, lines 48-67; col. 38, lines 1-20). It is noted that the merging or

insertion of fragments is considered to result in the modification or creation,

respectively, of depth and alpha values. It is noted that the respective claim language

fails to disclose what exactly constitutes a "depth cueing value" and thus it is noted that

said depth values for incoming pixels are considered to read on depth cueing values

and as such a respective depth value would increase/decrease as processing is performed along the Z-axis accordingly.

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the teachings of Griffin into the system taught by Foley et al. and Deering, because through such an incorporation the amount of memory required for the storage of the image data within the graphics system would be reduced, thus requiring less physical memory to be implemented or allocated within said graphics system for the storage of said image data, while at the same time said incorporation would utilize conventional graphic techniques, such as a Z-buffer, which would not require specialized hardware to be implemented.

Foley et al. teaches a viewing means by which rendered (drawn) objects are viewed dependent on a given perspective projection, wherein the presented view of said objects change in accordance with the change of said perspective projection. The visual effect of said perspective projection is similar to that of photographic (camera) systems (p. 230-236, § 6.1). Foley et al. teaches a synthetic camera (p. 299-302, § 7.3.4).

6.   In regard to claim 2 the rational disclosed in the rejection of claim 1 is incorporated herein, specifically that in depth cueing interpolation occurs between the color of a given primitive (color of a given object as represented by its primitive) and a user-specified depth-cue (target) color (Foley et al. – p. 610-611, §14.3.4; p. 727-728, §16.1.3; p. 1044-1046, §20.8.2). It is noted that the interpolation between said primitive color and said user-specified depth-cue color is considered to yield a spectrum of

colors, wherein said spectrum of colors is a combination of (different from) said primitive

color and said user-specified depth-cue color.

7.   In regard to claim 10 the rationale disclosed in the rejection of claim 1 is

incorporated herein.

8.   In regard to claim 11 Foley et al. teaches that the graphics system is thus an

intermediary between the application program and the display hardware (pp. 17-19, §

1.6.1-1.6.2). The rationale disclosed in the rejection of claim 1 is incorporated herein.

9.   In regard to claim 12 the rationale disclosed in the rejection of claim 2 is

incorporated herein.

10.   In regard to claim 20 Foley et al. teaches that the graphics system is thus an

intermediary between the application program and the display hardware (pp. 17-19, §

1.6.1-1.6.2). The rationale disclosed in the rejection of claim 1 is incorporated herein.

11.   In regard to claim 21 the rationale disclosed in the rejection of claim 1 is

incorporated herein. It is noted said system is considered to perform the method.

12.   In regard to claim 22 the rationale disclosed in the rejection of claim 2 is

incorporated herein.

13.   In regard to claim 27 the rationale disclosed in the rejection of claim 1 is

incorporated herein. It is noted said system is considered to perform the method.

14.   In regard to claims 28-33 the rationale disclosed in the rejection of claim 1 is

incorporated herein. It is noted that the respective claim language fails to disclose what

exactly constitutes a "depth cueing value" and thus it is noted that said depth values for

incoming pixels are considered to read on depth cueing values and as such a

respective depth value would increase/decrease as processing is performed along the

Z-axis accordingly. It is noted said processing is considered to be performed by said

processor. It is implicitly taught that depth values for respective incoming pixels aid in

the determination of the strength of the depth cueing affect as distance (e.g., depth) is

an essential element (e.g., parameter) of depth cueing ("...depth cueing ... exploits the

fact that distant objects ... appear dimmer than closer object..." – Foley et al.: pp. 610-

611).

Response to Amendment

15.   In response to Applicant's remarks in regard to the prior 35 U.S.C. 101 rejection

the Applicant is directed to the respective 35 U.S.C. 101 rejection above which has

been further clarified.

16.   In response to Applicant's remarks that the references fail to show certain

features of applicant's invention, it is noted that the features upon which applicant relies

(i.e., depth cueing and alpha value processing is only performed for objects within this

narrowly defined depth cueing area) are not recited in the rejected claim(s). Although

the claims are interpreted in light of the specification, limitations from the specification

are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057

(Fed. Cir. 1993).

Foley et al. teaches that depth cueing, seen as a simplified version of the effects

of atmospheric attenuation, exploits the fact that distant objects (objects intended to

appear father from a viewer) appear dimmer than closer object. In depth cueing

interpolation occurs between the color of a given primitive (color of a given object as

represented by its primitive) and a user-specified depth-cue (target) color (pp. 610-611, §14.3.4; pp. 727-728, §16.1.3; pp. 1044-1046, §20.8.2). Foley et al. illustrates a depth cueing area in Color Plate II.24 and Color Plate II.25. It is implicitly taught by Foley et al. that said depth cueing area depends, at least to some degree, on a viewpoint as said scenes in Color Plate II.24 and Color Plate II.25 contain various graphical information displayed from a given viewpoint. In addition it is noted that said Color Plates are considered to comprise objects in both the background and foreground.

Foley et al. teaches that at times one might want the view volume (e.g., volume which defines a respective depth cueing volume) to be finite, in order to limit the number of output primitives projected on the view plane. This can be accomplished through the use of a front clipping plane and a back clipping plane. Said planes are specified by the by the signed quantities front distance (F) and back distance (B) relative to the view reference point (viewpoint) and along the view-plane normal (p. 240, ¶ 2-3; Fig. 6.19). It is noted that said planes define which, at least in part, define said view volume are considered to be based on, at least in part, said view reference point.

Assuming that the respective claim language discloses limiting processing to only said depth cueing area, which it currently does not, it is noted that the above teachings are considered to read on limiting processing to only said depth cueing area as Foley et al. explicitly teaching the ability to limit processing of a volumetric space to a finite volume.

17.   In response to Applicant's remarks in regard to the rejection of claims 28-33 the

Applicant is directed to the respective rejections above which have been further

clarified.

18.   Applicant's remarks in regard to "...advantages such as preventing screen..." (p.

10) are consider unclear. It is believed the Applicant may have intended to state

"...advantages such as preventing screen tearing..." Clarification is requested.

19.   Applicant's remarks have been considered but are not deemed persuasive.

Conclusion

20.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to PETER-ANTHONY PAPPAS whose telephone number

is (571)272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

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